

Names: _____

Chem 227 / Dr. Rusay

Aldehyde & Ketone Syntheses

For the following questions. Show your reaction schemes neatly, and clearly indicate reagents above the reaction arrows. Use as few steps as possible.

1. Provide a possible synthesis for 4-methyl-2-pentanone from each of three different starting compounds having the following respective functionalities. The starting material can be **any** compound found in the Aldrich Catalog (Available from the stockroom or in the lab.). Provide the Aldrich Catalog number beneath the compound. Any reagents can be used. They do not need to be found in the Aldrich Catalog. The closer that the starting material resembles the product, the better.

a) aldehyde

b) alkyl halide

c) nitrile

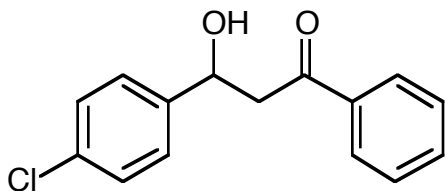
2. Repeat question #1 for the synthesis of 3-methyl-2-(E)-pentenal using a starting material with each of the following respective functions.

a) carboxylic acid

b) alkyne

c) alcohol

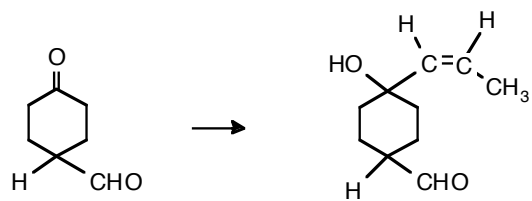
3. On a separate page, outline a synthesis for the following compound from the available starting materials and provide answers/calculations. Attach as the last page(s) of the worksheet.



You have only a limited number of starting materials available for the synthesis. (Respective maximum quantities available for each are indicated.): toluene (100 mL), acetyl chloride (25 mL), formaldehyde (227 g), methyl chloride (50 mL), ethyl acetate (50 mL), ethanol (1 L). There is a limitless supply of any other solvent or reagent that you may need.

- Calculate the maximum possible theoretical yield in grams for your synthesis based on the respective available quantities. (Show your calculation.)
- Assume that your synthesis actually produced an 80% yield for each of your steps, how many grams of final product would you obtain? (Show your calculation.)

4. Provide reactions and reagents to carry out the following synthesis. They do not need to come from the Aldrich catalog. Any number of reaction steps are acceptable, but the fewer the better.



(mixture of diastereomers)

